Unit 10 - week 8

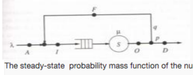
Assignment 8

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-09-25, 23:59 IST.

Each of the following questions has four options out of which one or more options can be correct. Individual marks are mentioned corresponding to each questions. In case of multiple answers partial marks will be awarded for every correct option chosen provided no incorrect option have been chosen. 0 marks are awarded for questions not attempted.

1) Consider the M/M/1 FCFS queue with feedback as shown in figure below. **2 points**



The steady-state probability mass function of the number of jobs N in the system is given by:

- $P(N = i) = (1 - \frac{\lambda}{\mu p})(\frac{\lambda}{\mu p})^i, i = 0, 1, \ldots$
- $P(N = i) = (1 - \frac{\lambda}{\mu})(\frac{\lambda}{\mu p})^i, i = 0, 1, \ldots$
- $P(N = i) = (1 - \frac{\lambda}{\mu})(\frac{\lambda}{\mu})^i, i = 0, 1, \ldots$
- $P(N = i) = (1 - \frac{\lambda p}{\mu})(\frac{\lambda p}{\mu})^i, i = 0, 1, \ldots$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$P(N = i) = (1 - \frac{\lambda}{\mu p})(\frac{\lambda}{\mu p})^i, i = 0, 1, \ldots$

2) There is an e-commerce website. Customers arrive at the site at the rate λ. The webserver used to display products has an average service time of 0.05 seconds. Customers view the products, and spend an average of 15 seconds thinking. After thinking, with a probability 0.8 they return to view another product, with probability 0.1 decide to buy the product and get transferred to a secure web server has an average service time of 0.2 seconds. All times are assumed to be exponentially distributed, arrivals are Poisson. The above can be modelled as a queueing network. Then, it is **2 points**

- Closed queueing network
- Tandem queueing network with two nodes
- Tandem queueing network with three nodes
- Open queueing network

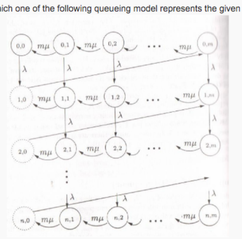
No, the answer is incorrect.
Score: 0
Accepted Answers:
Open queueing network

3) The difference between conventional Petri nets and Stochastic Petri net (SPN)s is that **2 points**

- an SPN is random.
- an SPN can't only be used in the analysis of small systems.
- an SPN includes the concept of time.
- an SPN can't represent synchronization.

No, the answer is incorrect.
Score: 0
Accepted Answers:
an SPN includes the concept of time.

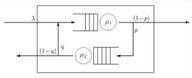
4) Which one of the following queueing model represents the given reachability graph of the generalized stochastic Petri net (GSPN) model? **2 points**



- $M/E_m/1/n + 1$
- $M/E_n/m + 1/n$
- $M/M/1/n + 1$
- $M/E_m/1/n$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$M/E_m/1/n + 1$

5) An open queueing network is shown in the following fi gure: **2 points**

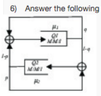


Given p = 0:5; q = 0:4; λ= 10/sec. The mean arrival rates at queue 1 and queue 2 , denoted as respectively are equal to λ_1 and λ_2, respectively are equal to

- $\lambda_1 = 12.5/sec,\ \lambda_2 = 6.25/sec$
- $\lambda_1 = 6.25/sec,\ \lambda_2 = 12.5/sec$
- $\lambda_1 = 1.25/sec,\ \lambda_2 = 62.5/sec$
- $\lambda_1 = 1.25/sec,\ \lambda_2 = 6.25/sec$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\lambda_1 = 12.5/sec,\ \lambda_2 = 6.25/sec$

6) Answer the following two questions based on the closed queueing network depicted as the following: **2 points**



The relation between mean arrival rates at queue 1 and 2, denoted as λ_1 and λ_2, respectively, is equals to

- $\lambda_2 = \frac{(1-q)}{(1-p)}\lambda_1$
- $\lambda_1 = (1 - q)\lambda_2$
- $\lambda_2 = (1 - p)\lambda_1$
- $\lambda_2 = \frac{(1-p)}{(1-q)}\lambda_1$

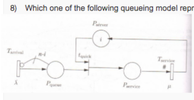
No, the answer is incorrect.
Score: 0
Accepted Answers:
$\lambda_2 = \frac{(1-q)}{(1-p)}\lambda_1$

7) Given that C is the number of jobs circulationg in the network. The steady-state probability that $i^{th}, i = 1, 2$, queue is busy, equals to **2 points**

- P(Queue 1 is busy)= $1 - P(C, 0)$, P(Queue 2 is busy)= $1 - P(0, C)$.
- P(Queue 1 is busy)= $1 - P(0, C)$, P(Queue 2 is busy)= $1 - P(C, 0)$.
- P(Queue 1 is busy)= $P(0, C)$, P(Queue 2 is busy)= $P(C, 0)$.
- P(Queue 1 is busy)= $P(C, 0)$, P(Queue 2 is busy)= $1 - P(0, C)$.

No, the answer is incorrect.
Score: 0
Accepted Answers:
P(Queue 1 is busy)= $1 - P(0, C)$, P(Queue 2 is busy)= $1 - P(C, 0)$.

8) Which one of the following queueing model represents the given generalised stochastic Petri net (GSPN) model ? **2 points**



- $M/M/i/n$
- $M/M/i/\infty$
- $M/M/n/i$
- $M/M/n - i/n$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$M/M/i/n$